

WHAT IS CLAIMED IS:

1                    1.     A pseudolite comprising:  
2                    a reference frequency oscillator;  
3                    multiple signal generators, communicatively coupled to and  
4                    under the control of the reference frequency oscillator, for  
5                    generating respective coherent signals at different frequencies; and  
6                    a transmitter antenna, communicatively coupled to the  
7                    multiple signal generators, for transmitting the two signals at two or  
8                    more distinct frequencies.

1                    2.     The pseudolite of claim **1**, wherein the signals are C/A  
2                    code signals.

1                    3.     The pseudolite of claim **1**, wherein the signals are from  
2                    the same family of 1023 codes as GPS satellite signals.

1                    4.     The pseudolite of claim **1**, wherein the signals are from  
2                    the same family of 1023 codes as GPS satellite signals and are not L1  
3                    frequencies.

1                    5.     A multi-frequency receiver comprising:  
2                    an oscillator, defining a clock; and  
3                    multiple GPS receivers, communicatively coupled to and  
4                    clocked by the oscillator, for receiving L1 (1575.42MHz) GPS C/A  
5                    code signals and signals from the same family of 1023 codes as the  
6                    GPS satellite signals are drawn from.

1                    6.     A receiver comprising:  
2                    multiple frequency translators, for converting signals received

3 on respective different multiple frequencies that are not a  
4 predetermined frequency to the predetermined frequency; and  
5 multiple GPS receivers, communicatively coupled to  
6 respective ones of the multiple frequency translators. .

1 7. The receiver of claim **5**, wherein the predetermined  
2 frequency is the GPS L1 frequency (1575.42MHz).

1 8. A bank of N-channel GPS receivers and attached  
2 frequency converters with antennae located at a fixed and precisely  
3 known (surveyed) location, called a "Reference Receiver", that measures  
4 all of the code and carrier phase relationships between all of the signals  
5 transmitted by all of the pseudolites in view, one or more Mobile Receivers  
6 electronically configured the same as a Reference Receiver, and a data  
7 link connecting the Mobile Receivers to the phase data collected by the  
8 Reference Receiver.

1 9. A reference receiver joined with each pseudolite, data  
2 broadcast over RF ranging signal, no requirement for separate reference  
3 receiver and radio communications link.

1 10. A computational process for determining the carrier  
2 phase integer ambiguities for each received pseudolite signal that is based  
3 on the preserved and observed time and phase alignment between the  
4 code and carrier portions of the transmitted multi-frequency pseudolite  
5 signals.